EPA Certification & Compliance Workshop

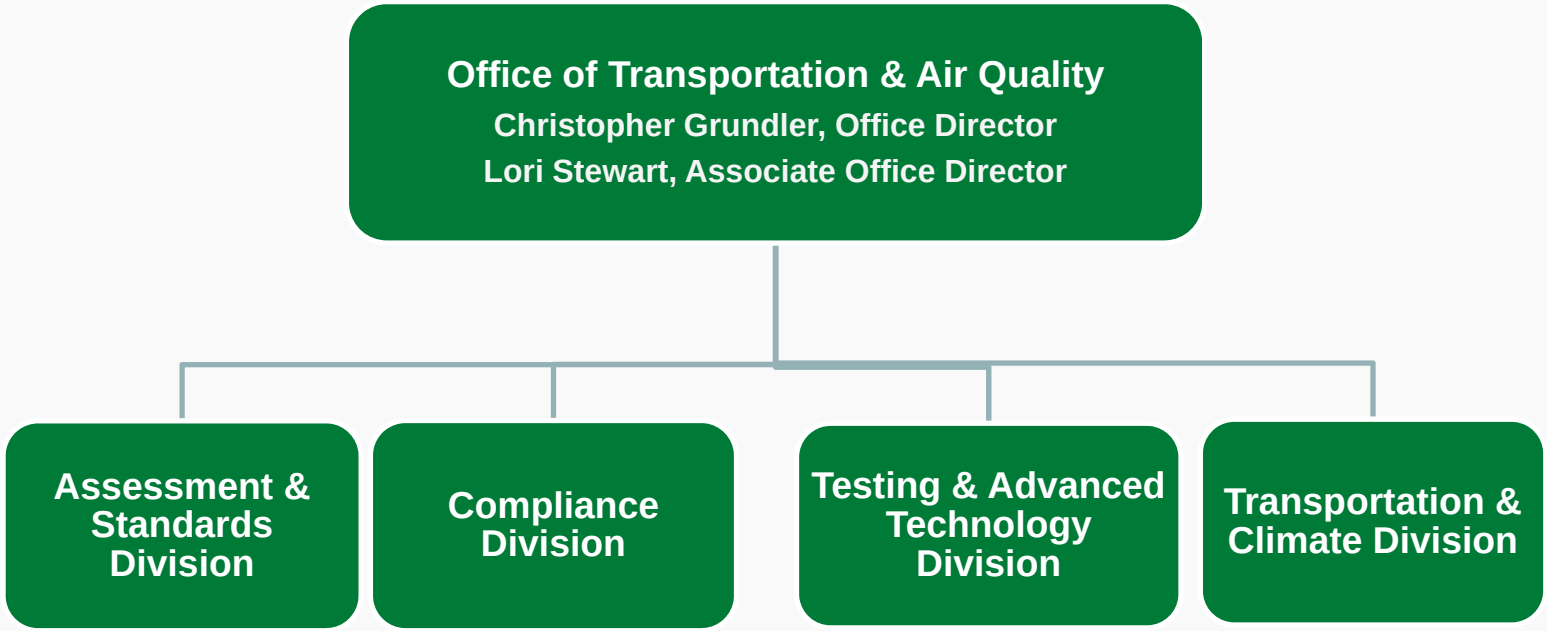
Diesel Engine Compliance Center

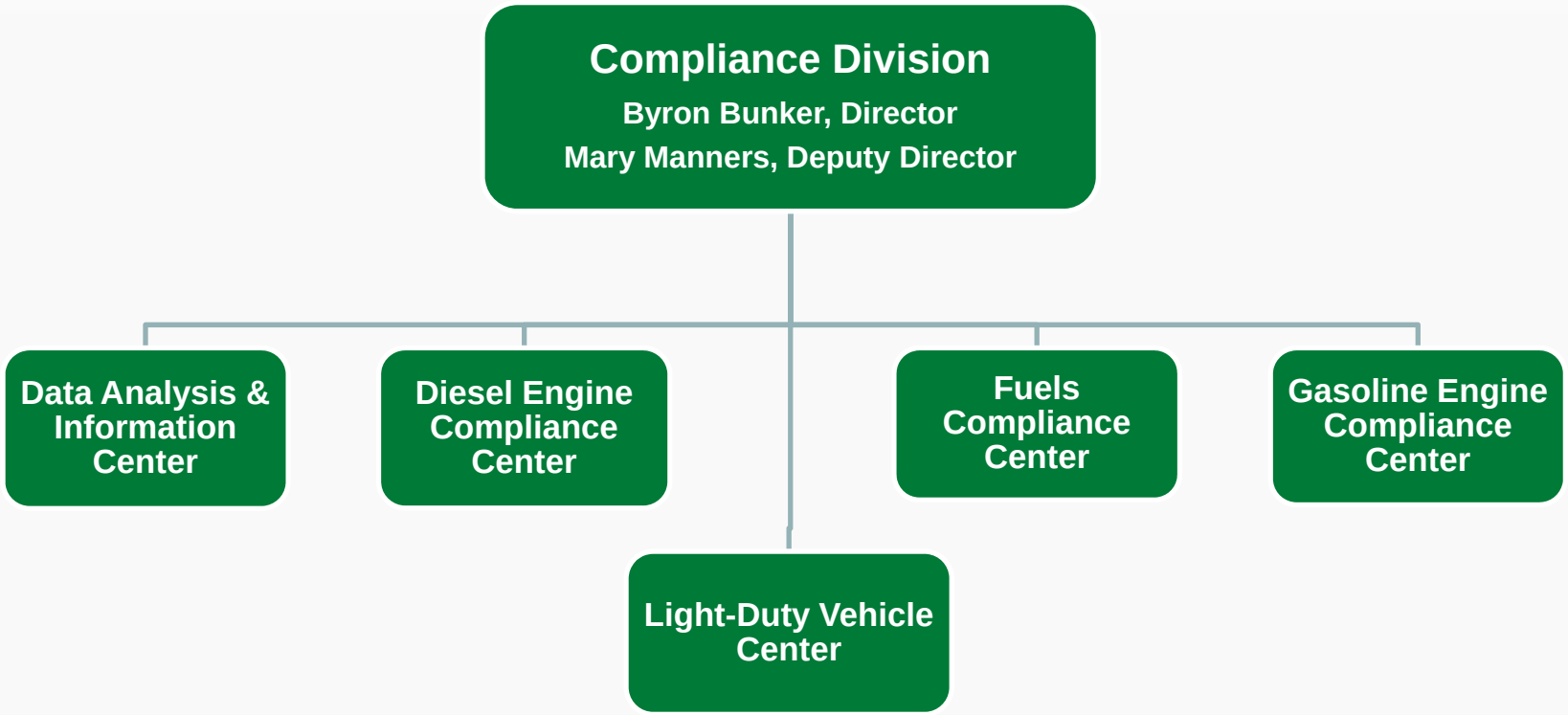
May 16, 2013

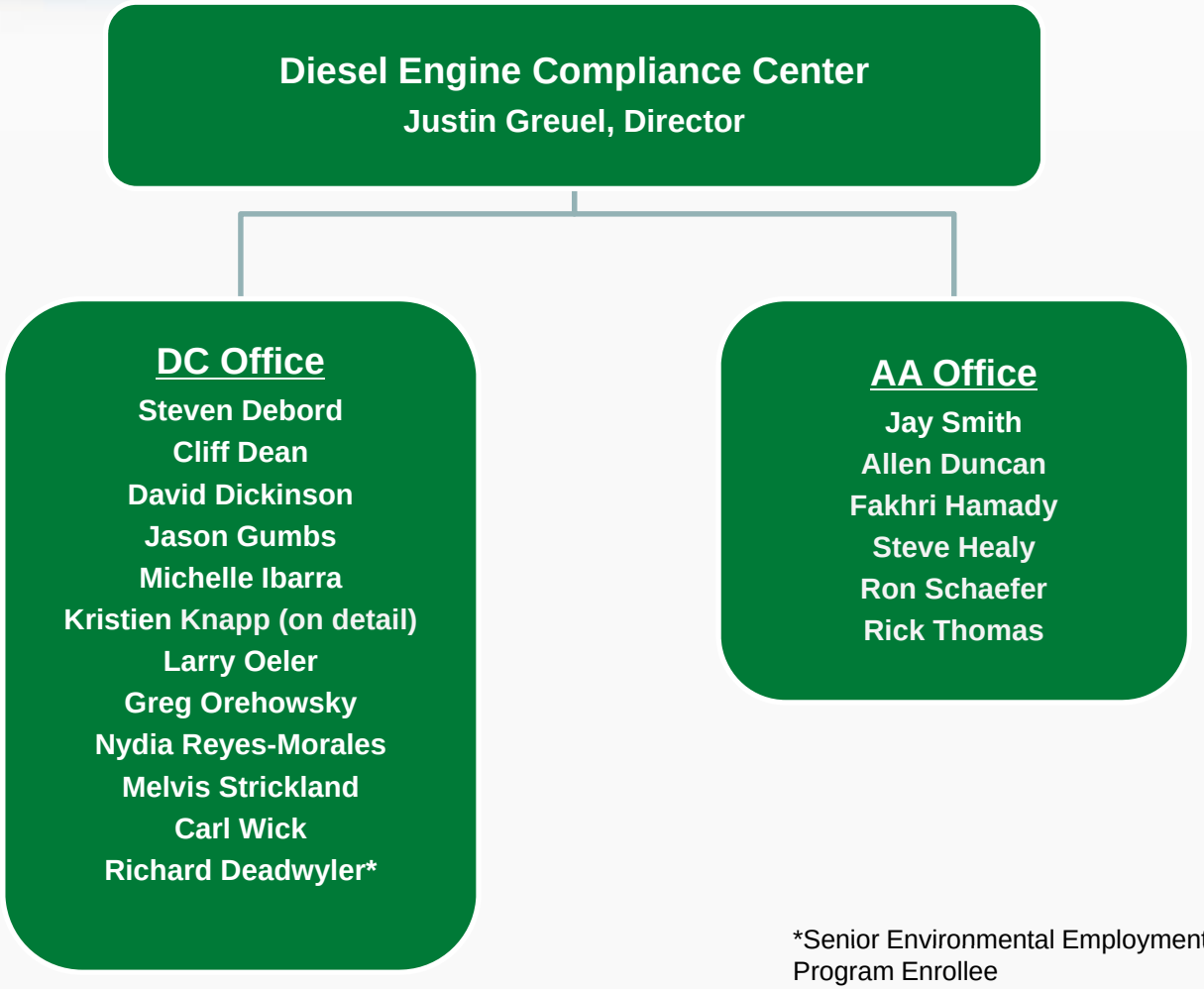
Agenda

- **10:30 am** **Welcome and Organizational Overview**
- **10:45 am** **Industry Sector Overviews**
- **11:30 am** **Compliance Testing Topics**
- **12:00 pm** **Lunch**
- **1:00 pm** **Compliance Reporting and Other Compliance Programs**
- **2:00 pm** **Certification Overview**
- **3:00 pm** **Break**
- **3:15 pm** **Electronic Data and Information Systems Update**
- **3:45 pm** **Questions and Answers**

Organizational Overview


Office of Transportation & Air Quality
Christopher Grundler, Office Director
Lori Stewart, Associate Office Director
Assessment & Standards Division
Compliance Division
Testing & Advanced Technology Division
Transportation & Climate Division


Compliance Division
Byron Bunker, Director
Mary Manners, Deputy Director
Data Analysis & Information Center
Diesel Engine Compliance Center
Light-Duty Vehicle Center
Fuels Compliance Center
Gasoline Engine Compliance Center



*Senior Environmental Employment Program Enrollee

Assignments

On-Highway Engines*	Vehicle GHG	Nonroad	Marine*	Locomotive
• Steven DeBord • Jason Gumbs • Greg Orehowsky • Jay Smith	• Allen Duncan • Fakhri Hamady • Steve Healy • Ron Schaefer • Rick Thomas	• Steven Debord • Jason Gumbs • Michelle Ibarra • Greg Orehowsky • Jay Smith • Melvis Strickland • Carl Wick • Allen Duncan • Ron Schaefer	• Melvis Strickland • Carl Wick • Rick Thomas	• Michelle Ibarra • Larry Oeler
*Including GHG and alt fuel conversions			*Including IMO	

Industry Sector Overviews

Heavy-Duty Highway Engines

HD Diesel On-Highway Engines

- Sector encompasses any engine used in an on-highway motor vehicle with a GVWR greater than 8,500 lbs
  - Engines in vehicles 8,501-14,000 lbs. GVWR can be optionally chassis certified
  - Semi-tractors, vocational vehicles, certain cab-complete vehicles (ambulances, etc)
- Regulated under 40 CFR Parts 86 (criteria) & 1036 (GHG)
  - Part 86, Subpart A contains certification and compliance provisions
  - Part 86, Subpart N contains testing provisions (mostly directed toward Part 1065 now)
  - Part 86, Subpart T contains provisions for the manufacturer in-use testing program
  - Part 1036 covers comprehensive GHG requirements
- Sector represents 16% of the total mobile-source emissions (combined pollutants – 2009 data)
  - Second only to light duty vehicles
- Comparatively small number of manufacturers
  - 10-12 manufacturers with a production volume of approximately 600,000
  - 95% of volume is produced in the U.S.
  - 40 – 60 certificates issued a year
  - Includes aftermarket alternative fuel convertors

HD Diesel On-Highway Engines

- Certification priorities
  - Technical review of emission control system, including engineering data and analysis (AECDs)
    - More on reporting of AECDs later today
    - SCR thermal management strategies
      - Increase temperature into the SCR catalyst to allow dosing over broader range of operation
  - Review of durability test plan and data
  - Adjustable parameters
    - DEF quality adjustment – more on this later today
  - Confirmation that all regulatory requirements are met
    - New GHG requirements for engines
      - CO_2, CH_4, and N_2O standards
      - 2013 MY early credit certification
  - Emergency vehicle AECDs
    - New engine certification vs. field fixes

HD Diesel On-Highway Engines
Applicable Compliance Programs

- Testing
  - Confirmatory testing
  - Selective enforcement auditing
  - Manufacturer in-use testing
  - EPA in-use testing
- Reporting
  - Defect reporting
  - Verification of ABT credit balance
  - Reporting of annual production volumes

Nonroad Engines

Nonroad Diesel Engines

- Sector encompasses engines used in non-road equipment, including stationary applications
  - Engines are certified independent of equipment
  - Sizes range from less than 8 kW up to 4 MW
  - Broad mix of technologies – mechanical and electronic fuel control, aftertreatment
- Presently regulated under 40 CFR Parts 1039 (mobile) & 60 (stationary)
  - Part 1039, Subparts A-C contain certification and compliance provisions
  - Part 1039, Subpart F contains testing provisions (directed toward Part 1065)
  - Part 60, Subpart IIII outlines comprehensive stationary requirements
- Sector represents 10% of the total mobile-source emissions (combined pollutants – 2009 data)
- Comparatively large number of manufacturers
  - 60+ engine manufacturers and production volumes exceeding 1M units each year
  - More than 65% of volume is produced outside the U.S.
  - 550+ certificates issued each year
  - 750+ equipment manufacturers participating in Transition Program for Equipment Manufacturers (TPEM)

Nonroad Diesel Engines

- Certification priorities – Tier 4 final implementation
  - Review of durability test plans and data
  - Technical review of emission control system designs, including engineering data and analysis
    - AECDs, in general
    - New technology mixes (DPFs, SCR, SCR-only for some Tier 4 final)
    - SCR-related inducements
    - SCR thermal management strategies
  - Adjustable parameters
    - Mechanical engines – more to come later today
    - DEF quality adjustment – more to come later today
  - Confirmation that all regulatory requirements are met
    - NTE standards
    - Transient testing
- Alternative fuel conversions
  - In-service engines - more to come later today

Nonroad Diesel Engines
Applicable Compliance Programs

- Testing
  - Confirmatory testing
  - Selective enforcement auditing
  - EPA in-use testing
- Reporting
  - Defect reporting
  - Verification of ABT credit balance
  - Reporting of annual production volumes
  - Transition Program for Equipment Manufacturers (TPEM) annual production volumes

Marine Engines

Marine Diesel Engines

- Sector encompasses engines used in marine vessel propulsion and auxiliary applications, including stationary engines
  - Engines are certified independent of vessel/equipment
  - Sizes range from less than 37 kW up to 80 MW
- Regulated under 40 CFR Parts 94/1042 (mobile) & 60 (stationary)
  - Part 1042, Subparts A-C contain certification and compliance provisions
  - Part 1042, Subpart F contains testing provisions (directed toward Part 1065)
  - Part 1042, Subpart I contains remanufactured engine requirements
  - Part 60, Subpart IIII outlines comprehensive stationary requirements (engines > 10 L/cylinder)
- Also subject to international standards under 40 CFR Part 1043
  - Act to Prevent Pollution from Ships (APPS) requires compliance with MARPOL Annex VI
- Sector represents 12% of the total mobile-source emissions (combined pollutants – 2009 data)
- Comparatively large number of manufacturers
  - 40+ engine manufacturers and production volumes around 21,000 units each year
  - Approximately 50% of volume is produced inside the U.S.
  - 240+ certificates issued each year

Marine Diesel Engines

- Certification priorities – Tier 3 & 4 implementation for Category 1 & 2 engines (<30 L/cylinder), Tier 2 implementation for Category 3 engines (> 30 L/cylinder)
  - Review of durability test plans and data
  - Technical review of emission control system designs, including engineering data and analysis
    - AECDs, in general
    - SCR systems – different inducement approach than on-highway/nonroad
  - Confirmation that all regulatory requirements are met
    - NTE standards / mode caps
    - Remanufactured engine standards
    - Dual fuel (CNG, LNG) certification
    - Vessel reflagging
- North American Emission Control Area implementation
  - More to come later today

Marine Diesel Engines
Applicable Compliance Programs

- Testing
  - Confirmatory testing
  - Selective enforcement auditing
  - EPA in-use testing
  - Production-line testing
- Reporting
  - Defect reporting
  - Verification of ABT credit balance
  - Reporting of annual production volumes
  - Reporting of quarterly production-line testing results

Locomotives

Locomotives

- Sector includes switch, line-haul, and passenger locomotives
  - Horsepower range: ~ 500 – 5000
- Regulated under 40 CFR Parts 1033
  - Part 1033, Subparts A-C contain certification and compliance provisions, including remanufactured engine requirements
  - Part 1033, Subpart F contains testing provisions (directed toward Part 1065)
  - Part 1033, Subpart G contains provisions for voluntary certification on non-OEM components
- Sector represents 2% of the total mobile-source emissions (combined pollutants – 2009 data)
- Comparatively small number of manufacturers
  - 15 engine manufacturers
  - 40+ certificates issued each year

Locomotives

- Certification programs in Part 1033
  - Freshly manufactured and remanufactured locomotives
    - Review areas:
      - Review of durability test plans and data
      - Technical review of emission control system designs as reported in software reporting template
      - Confirmation that all regulatory requirements are met
      - Any special requests, e.g. alternate useful life requests for high-speed nonroad engines
  - Non-OEM components
    - Program intended for manufacturers of engine components
    - Requires engineering assessment of component equivalence
    - 2 manufacturers participating
  - Automatic engine stop/start systems (AESSs)
    - Intended for manufacturers of idle-reduction systems
- Alternative fuels
  - Responding to inquiries on dual fuel (natural gas/diesel pilot) certification

Locomotives
Applicable Compliance Programs

- Testing
  - Confirmatory testing
  - Production-line testing / remanufacture audits
  - Manufacturer in-use testing
  - Railroad program
  - EPA in-use testing
- Reporting
  - Defects
  - ABT credit balance
  - Annual production volumes
  - Quarterly Production-Line Testing results
  - Quarterly remanufacture audit results

Heavy-Duty Highway Vehicles GHG

Heavy-Duty Vehicle GHG

- Sector encompasses trucks separated into 3 categories, with unique approaches and standards for each. Regulated under 40 CFR Part 1037.
  - Class 2b-3 heavy-duty pickups and vans - 40 CFR 1037.104
  - Class 2b-8 vocational vehicles - 40 CFR 1037.105
  - Class 7 & 8 tractors - 40 CFR 1037.106
- The Heavy-Duty GHG rule represents the first time HD vehicles above 14,000 lb GVWR have been required to certify emissions
- EPA and NHTSA have jointly developed these standards with EPA being the principle point of contact for both agencies and is the single point of entry for submitting information to both agencies.
- Sector represents 19% of the total mobile-source CO_2 emissions
- The HD vehicle sector represents a moderate number manufactures
  - 4 vertically integrated tractor and vocational vehicle manufacturers
  - 3 major HD pickup and van manufacturers
  - Estimated 15 vocational vehicle manufacturers

Heavy-Duty Vehicle GHG

- Issued first certificates in February 2012
  - 2013 and 2014 MY vehicle certificates issued
- Currently focusing on:
  - Innovative technology approvals
  - Developing end of year reporting templates
  - Guiding new manufacturers through the certification process
  - Developing a Verify HD vehicle certification module
- January 1, 2014 mandatory certification
  - Anticipating significant volume of applications from vocational vehicle manufacturers
  - Recommend manufacturers present their certification plans to EPA staff before submitting their applications for certification
  - Workload uncertain at this point

Heavy-Duty Vehicle GHG
Applicable Compliance Programs

- Testing
  - Confirmatory testing
  - EPA in-use testing
- Reporting
  - Defect reporting
  - Verification of ABT credit balance
  - Reporting of annual production volumes
  - Compliance flexibilities include CO_2 credit Averaging, Banking and Trading

Compliance Testing Topics

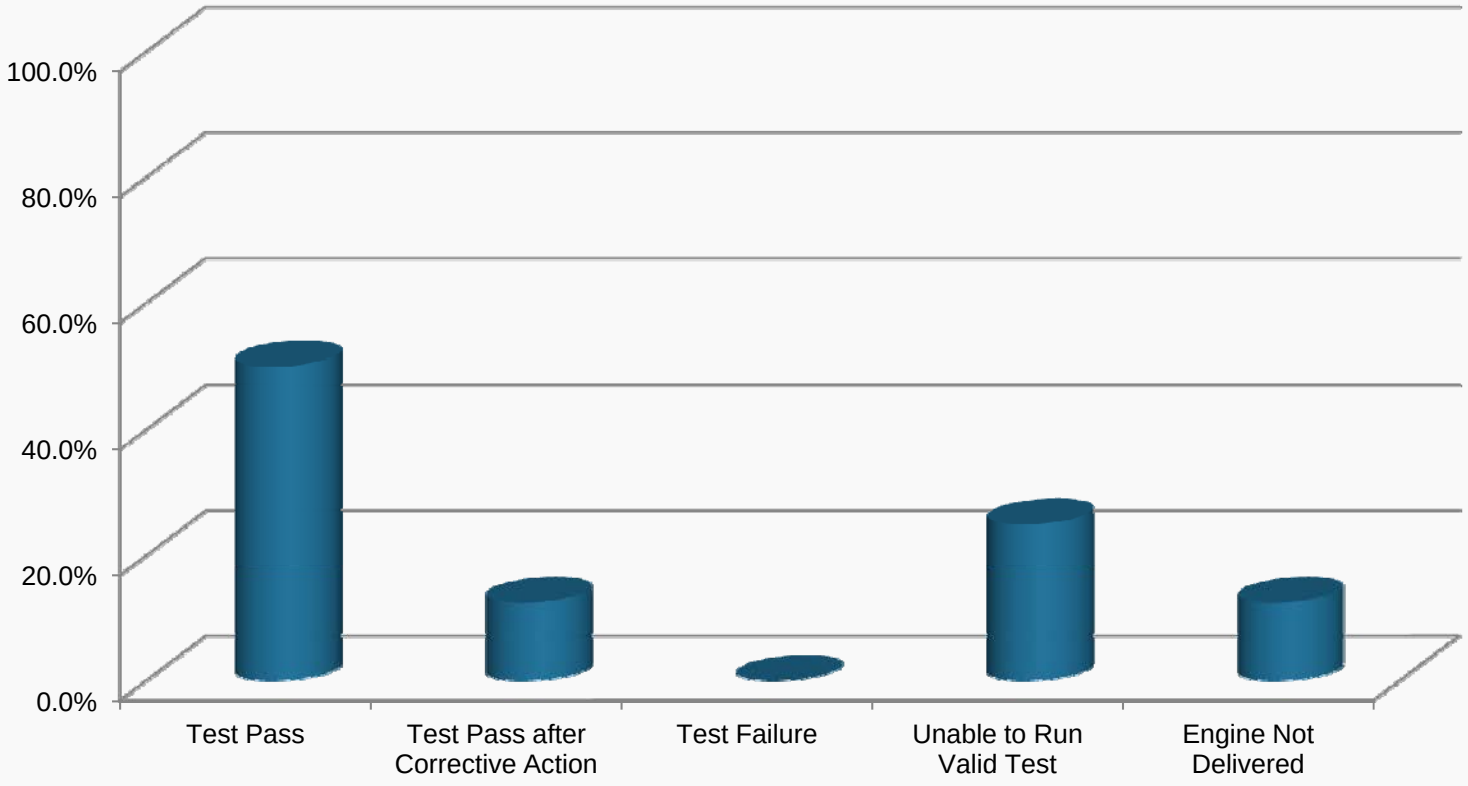
EPA Compliance Testing

- Goals of compliance testing program:
  - Ensure benefits stated in rulemakings are reflected in real world operation
  - Address level playing field issues for all market participants
  - Address compliance issues for new and in-use engines
- Compliance testing and analysis will utilize all available tools, including:
  - Confirmatory tests
  - Selective enforcement audits
  - General laboratory and records audits
  - In-use data evaluation from manufacturer and EPA test programs
  - Informal site visits

EPA Compliance Testing

- Important that manufacturers submit certification and production plans
  - Ensures timely selection and performance of compliance testing
  - See CD-13-06 (March 2013) for further instructions
- Information on preparing for confirmatory testing available at http://www.epa.gov/otaq/cert/eng-cert/confirmatory
  - Set up requirements
  - Test engine information sheet
- Information on selective enforcement audits can be found at 40 CFR Part 1068, Subpart E

2013 MY Nonroad Confirmatory Testing



In-Use Testing at NVFEL
HD On-Highway

- Currently in the third year of program evaluating 2010-level HD on-highway engines from multiple manufacturers
- Looking at a variety of metrics
  - NTE emissions performance (similar to manufacturer in-use program)
  - Overall emission levels (impacts of idling, transient operation, effectiveness of SCR thermal management, etc.)
  - Inducement strategies for SCR (if SCR equipped)
- 2011/2012 testing focused on large HHDDEs
- 2013 testing focused on MHDDEs and smaller HHDDEs

In-Use Testing at NVFEL
HD On-Highway

- Results to date
  - Broad success in achieving compliance with NTE requirements
  - Overall emission levels are varied across manufacturers
    - Technology selection
    - Thermal management effectiveness
    - Idle emission levels
  - Better understanding of AECD activation frequency and emission impacts
    - Influences future engine certification
  - Identification of areas for future regulatory improvements
- Results of HHDDE test program anticipated to be published in Q3 2013
  - Submitted to SAE for Fall COMVEC

Manufacturer In-Use Testing
HD On-Highway

- 2012 selections for on-highway industry sector
  - 13 engine families representing 7 manufacturers
  - Some previously tested families were selected again to assess emission control durability
  - Reports due January 19, 2014
- Selections for 2013 coming in June
- Prior test selections
  - 2010 – 6 engine families, 5 manufacturers
  - 2011 – 14 engine families, 11 manufacturers

Manufacturer In-Use Testing

Preliminary Summary of Results for 2010 Test Orders

Vehicle Result	Number of Vehicles	Range of Pass Ratio by Pollutant				
		NOx	NMHC + NOx	NMHC	CO	PM
Pass	10	0.96-1.00	-	1.00	-	-
	15	-	1.00	-	-	-
	26	-	-	-	1.00	-
	26	-	-	-	-	0.96-1.00
Fail	1	-	0.00	-	-	-

Manufacturer In-Use Testing

Preliminary Summary of Results for 2011 Test Orders

Vehicle Result	Number of Vehicles	Range of Pass Ratio by Pollutant			
		NOx	NMHC	CO	PM
Pass	52	0.91-1.00		-	-
	53	-	0.98-1.00	0.97-1.00	-
	52	-	-	-	0.96-1.00
Fail	1	0.40	-	-	-
	1	-	-	-	0.02

Manufacturer In-Use Testing Locomotive

- Data starting to come in from first test orders issued in 2007 and 2008
  - 2007 orders: 9-2007 MY engine families, 6 manufacturers
  - 2008 orders: 10-2008 MY engine families, 7 manufacturers
  - Data lag due to locomotives needing to attain service accumulation between 50 to 75% of useful life prior to testing
  - Reporting due 90 days after completion of testing; no requirement on timing to complete testing
- For 2012, resuming issuance of annual locomotive test orders
  - 13 engine families,10 manufacturers, 2007-2010 MYs
  - Selections focused on families anticipated to meet service accumulation requirement in near future; should reduce data lag
- Selections for 2013 coming in June

What to Expect in 2013

- Confirmatory testing
  - Expanded program at both EPA's NVFEL and contract laboratory
  - Targeting new technologies and/or low compliance margin engines
- In-Use Testing
  - 2013 test orders for manufacturer-run program in June
  - Continuation of EPA's in-use program, possibly expanding into nonroad sector
- Selective Enforcement Auditing
  - Continued re-establishment of SEA program, including lab auditing
- HD GHG
  - Conduct coastdown confirmatory testing to verify aerodynamic performance

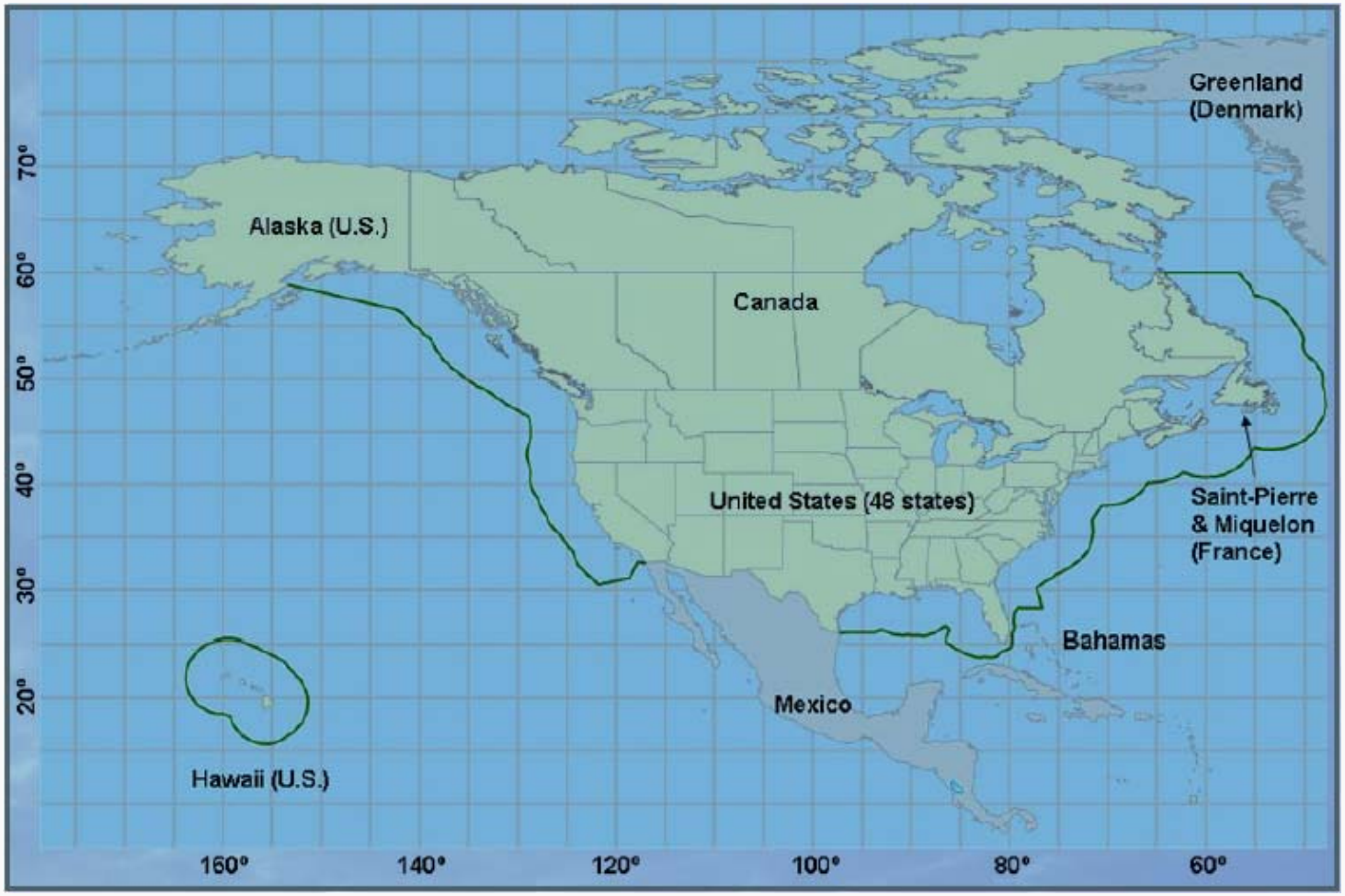
Compliance Reporting & Other Compliance Programs

Marine Emissions Control Area

EPA Regulations coordinate with MARPOL Annex VI via Part 1043

- Act to Prevent Pollution from Ships (33 U.S.C. §§1905-1915) provides authority to implement Annex VI in U.S.
- Emissions requirements codified at 40 CFR Part 1043:
  - Fuel sulfur limits and NOx emission standards
  - Describes procedures/requirements for obtaining Engine International Air Pollution Prevention (EIAPP) certificate
  - Applies Annex VI operational requirements to “ECA and ECA-associated areas”, including U.S. internal waters
  - Applies Annex VI operational requirements to non-Party vessels
- Engine manufacturers must also obtain certificate of conformity for EPA’s domestic emission standards for same engines
  - EPA’s domestic emission standards are largely harmonized with Annex VI standards

What is the North American ECA?



ECA Fuel Sulfur Standard

- "Global standard" (Regulation 14.1)
  - 4.5% prior to 2012
  - 3.5% for 2012-2019
  - 0.5% after January 1, 2020*
- ECA standard (Reg. 14.4)
  - 1.5% prior to July 2010
  - 1.0% after January 1, 2010 (in force for NA-ECA after August 1, 2012)
  - 0.1% after January 1, 2015

* 2020 Global Standard subject to review in 2018; may be delayed to 2025

Fuel Sulfur % is an Operational Requirement

- Low Sulfur Fuel Oil (LSFO) is currently required for all operation within the ECA
  - Vessels must switch to 1.0% S fuel*
  - Typically a blended product of residual and distillate fuel oil
- Requirement of 0.1% fuel sulfur beginning January 1, 2015 may mean switch to mostly distillate fuel
- Alternate means to address this requirement
  - Annex VI and Part 1043 allow EPA to approve the use of fuels not meeting this requirement provided that the vessel applies a method that results in equivalent emission reductions (e.g., exhaust scrubbers are now under review by EPA for use under this equivalent controls section)
  - EPA reviewing and in dialog with some manufacturers regarding CNG and LNG / diesel (pilot) dual fuel applications (mode in and out for ECA use)

* Certain exceptions apply for Great Lakes only vessels (1043.95)

Tier 3 NOx Standard

- Transition to Tier 3 occurs for vessels built after January 1, 2016
- Represents 80% NOx reduction from Tier I
- Achieving Tier 3 NOx likely will involve SCR aftertreatment
- Geographic-based limit for ships operating in ECA (> 130 kW)
- Allows for “on-off” emissions controls (see 1042.115(g))
  - Requires AECD operation based on GPS inputs
  - Continuous NOx monitoring required

How is ECA Enforced?

- Enforcement coordinated between Coast Guard and EPA (largely OECA) via MOU
  - Additional details on MOU included in appendix
- Both U.S. and foreign-flagged vessels are subject to ECA requirements and enforcement
  - 90% of annual U.S. port visits are under foreign flag
- OTAQ role includes engine certification, manufacturer education and assistance, and review of various compliance reports
  - Fuel Oil Notice of Availability Reports (FONARs), permit and exemption requests

How Does the MOU Operate?

- Coast Guard lead
  - Ship Inspections (part of routine USCG enforcement, e.g. safety, oil-water separators, engine and ship document review, engine parameter tests)
  - EPA may join some
- EPA lead
  - Shore side fuel sampling
  - Fuels provided by suppliers meet ECA requirements
  - Records maintained
- What does this mean for engine manufacturers?
  - USCG expects EIAPP cert & engine technical file on board
  - USCG policy requires EPA prior review of engine technical file

How has the ECA worked so far?

- Monthly FONARs received were initially more than 200 (July 2012), and those citing US ports were 70+
  - Dwindled down rapidly at year's end to a few dozen
- Initially, vessel owners worried that they would have to wait for EPA response before proceeding on voyage
  - Operation with non-compliant fuel oil is technically a violation
  - Submission of FONAR considered admission of violation and request for enforcement discretion
  - Voyage may continue without upon filing – no EPA response necessary
- Reports of suppliers requiring minimum LSFO purchase (or even accompanied by a minimum HSFO purchase) were forwarded to OECA for action
- Coast Guard has only detained 3 ships in the U.S. so far

Fuel Oil Non-Availability Reporting

- Annex VI allows for a case where **compliant fuel is not available**
  - E.g., a vessel sails from Brazil, where 1% bunker is not available, to Philadelphia
  - Guidance released 06/26/12
    - http://www.epa.gov/enforcement/air/documents/policies/mobile/finalfuelavailabilityguidance-0626.pdf
    - Reports now submitted through FOND (Fuel Oil Non-Availability Disclosure): http://www.epa.gov/compliance/enforcement/air/documents/policies/mobile/fondinstructions.pdf
  - Does not require distillate before 2015
    - http://www.epa.gov/otaq/regs/nonroad/marine/ci/420f12040.pdf
  - Requires report to USCG/EPA (= Fuel Oil Non-Availability Report / Fuel Oil Non-availability Disclosure)
  - Case specific
    - Frequent caller vs. once every year or less
    - Port of origin
    - How did they attempt to obtain compliant fuel
    - Requires that they get compliant fuel in first US port of call

Marine ECA Appendix

- IAPP Certificate
- EIAPP Certificate
- EPA-USCG Memorandum of Understanding

International Air Pollution Prevention Cert.

- Required for inspected vessels greater than 400 gross tons engaged in international routes
  - USCG issues, amends, revokes
- Pre-cert inspection includes:
  - SOx
    - Bunker Delivery Notes
    - Bunker Samples
  - Ozone Depleting Substances (ODS)
    - New installations of ODS prohibited after May 19, 2005 (with the exception of HCFCs, which are permitted until January 1, 2020)
  - Shipboard Incineration
- Volatile Organic Compounds
  - If a vessel is equipped with a vapor recovery system, the system must be in compliance with 46 CFR Part 39

Engine Int'l Air Pollution Prevention Cert.

- Required to certify NOx emissions standard compliance according to MARPOL Annex VI Regulation 13
- Required of Marine Category 3 Engines > 130 kW (except emergency only applications)
  - EPA issues, amends, revokes
- Demonstration of compliance with NOx emissions limit in accordance with NOx Technical Code (2008) issued by IMO.
- Consideration based on vessel age & engine characteristics:
  - Keel laid <Jan. 1, 1990 no EIAPP required
  - Keel laid >=Jan. 1, 1990 and <Jan. 1, 2000, above 5000kW and 90 L/cyl and Approved Method available: Tier I
  - Keel laid >=Jan. 1, 2001 and <Jan. 1., 2011: Tier I
  - Keel laid >=Jan. 1, 2011: Tier II
  - Keel laid >=Jan. 1, 2016: Tier III (except recreational vessels <24m in length and total propulsion power <750kW)

MOU between EPA and USCG to Enforce Annex VI

- USCG and EPA entered into a Memorandum of Understanding on June 27, 2011 to enforce the provisions of MARPOL Annex VI
  - http://www.epa.gov/compliance/resources/agreements/caa/annexvi-mou062711.pdf

MOU – Significant Provisions

- USCG and EPA agree to mutually cooperate in implementing Annex VI
- USCG and EPA agree to jointly develop protocols for carrying out enforcement activities on board ships, in ports and at facilities
- Roles are based primarily on each agency's areas of expertise
- USCG has primary authority to conduct ship inspections, examinations and investigations. EPA may request to or USCG may request that EPA attend or assist in on board activities.
- EPA has primary authority to verify compliance with fuel oil availability and quality requirements (shore side fuel requirements)
- Both USCG and EPA have authority to take enforcement actions. Actions may be referred from one agency to the other

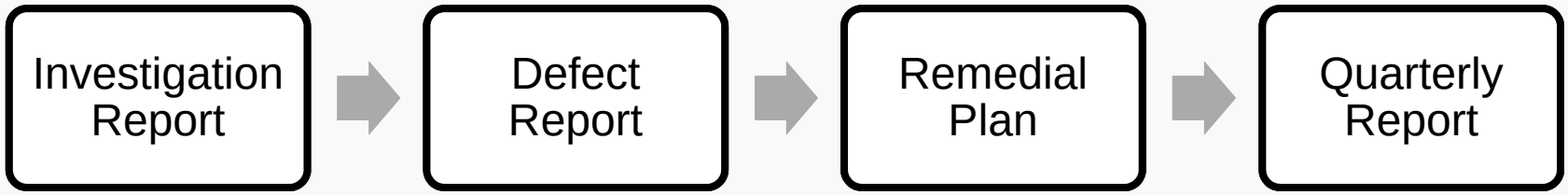
Defect and Recall Reporting Overview

Defect and Recall Reporting Regulations

- Part 85 Regulations
  - 40 CFR §85.1901
  - Applicable to HD Highway

Defect and Recall Reporting Regulations

- Part 1068 Regulations
  - 40 CFR §1068.501
  - Applicable to NRCI, Locomotive, Marine CI, etc.



Defect and Recall Reports

- Part 85 - HD Highway
  - Electronic reporting system (EDIR/VERR System)
    - Reporting documents and instructions can be found at http://epa.gov/otaq/verify/publications.htm#edir
- Part 1068 - NRCI and other categories
  - Hardcopy reporting following regulation format
    - Recommend electronic copy
    - Submit to Justin Greuel, your EPA cert rep, Cliff Dean and Michelle Ibarra
  - Contractor assists with internal EPA database
  - Plan to include nonroad reporting in Verify in the future

DR Preparation Tips

- Follow the regulation format (§1068.501(d))
- If some information not available when DR initially filed, provide reason and amend DR as soon as information available.
- Amend DR if information significantly revised
- Most common area for follow-up is defect description
  - §85.1903(c)(2), §1068.501(d)(3)

Defect Description - continued

- EPA looking for enough information to clearly identify device, system or assembly which has the defect, what the defect is and to the extent known at the time, the cause of the defect
- EPA most likely to request follow-up information when aftertreatment devices affected:
  - Greatest emissions impact
  - Many variables can affect
  - Occasionally request root cause information

Process Questions/Suggestions

- Submitting Investigation Report or Defect Report doesn't automatically mean recall
- File DR with EPA before EPA calls to ask about problem
- Don't hesitate to contact EPA with questions
  - Open invitation to review draft reports with new OEM/employee prior to submittal

EPA Activity

- Beginning to review manufacturers' in-house defect monitoring and reporting processes
  - Have begun with nonroad sector
  - Plan to work with at least 1-2 manufacturers per year
- Finalizing modifications to in house database to incorporate 1068 Investigation Reports, etc.
- Plan to better incorporate knowledge gained from defect reporting into new engine certification

Contacts

- Your EPA certification representative
- Cliff Dean
  - Dean.Clifford@epa.gov
- Michelle Ibarra
  - Ibarra.Michelle@epa.gov

Compliance Reporting Overview

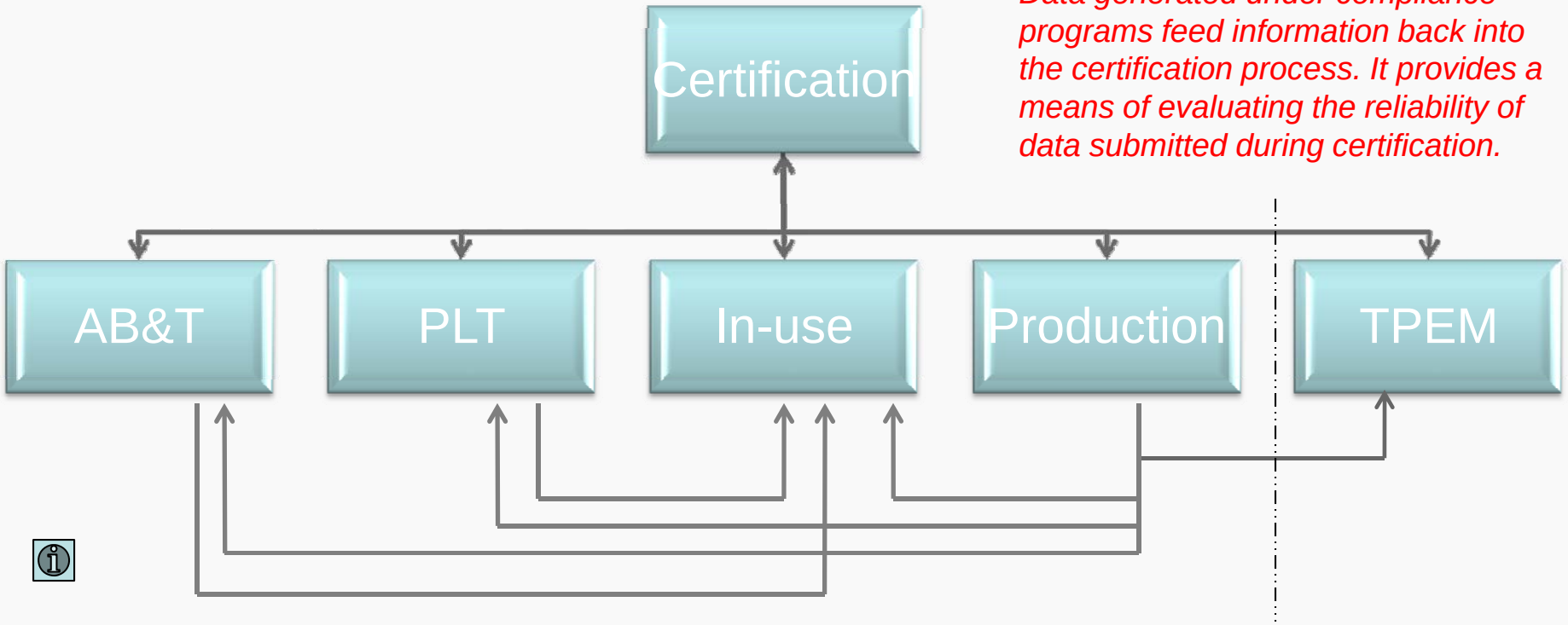
Compliance Reporting Programs

- Brief overview
- Manufacturers' reporting obligations
- How to submit compliance reports
- Template availability

Compliance Programs

Compliance programs verify compliance with emission requirements at different stages of an engine's useful life, in accordance with the spirit of the Clean Air Act.

Data generated under compliance programs feed information back into the certification process. It provides a means of evaluating the reliability of data submitted during certification.



Manufacturers' Reporting Obligations

- Dear Manufacturer Letter CD-12-16 (October 2012)
  - Reminder to manufacturers of various reporting obligations
  - Announces new process for submitting reports through the VERIFY Document Module
  - Instructs manufacturers to begin using templates for reporting and to submit past due reports
  - Found at: http://www.epa.gov/otaq/cert/dearmfr/dearmfr.htm
- Failure to report may result in:
  - Referral of violation to OECA for possible assessment of civil penalties
  - Revocation, suspension, or voiding of current or prior model year certificates
  - Denial of new certificates

How to Submit Compliance Reports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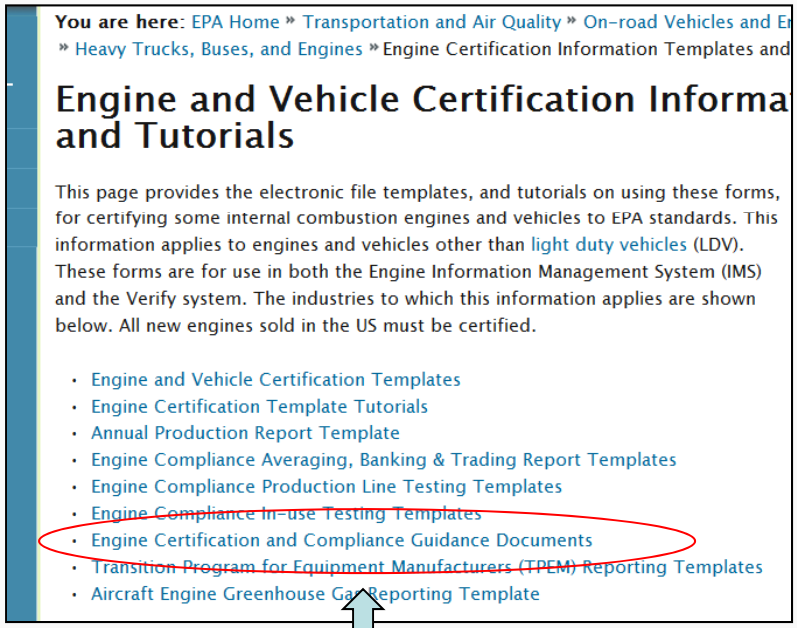
- Use EPA-provided, Excel-based templates
  - Templates found at http://www.epa.gov/otaq/certdat2.htm
  - Templates are updated periodically. Check for new versions.
  - Facilitates compiling of information in internal database
  - Data will be reviewed in conjunction with certification
    - We may contact you if reports are missing.
- Submit compliance reports through VERIFY
  - Submit questions / comments about HD/NRCI templates to Jason Gumbs (gumbs.jason@epa.gov)
  - Submit questions about compliance programs to your EPA certification representative
  - Do not submit TPEM equipment manufacturer documents via VERIFY
- Check your records – make sure you have submitted all your reports

How to Submit Compliance Reports



- Guidance on how to successfully submit through VERIFY
  - http://www.epa.gov/otaq/certdat2.htm
  - Click on “Engine Certification and Compliance Guidance Documents”
- Note instructions on how to name your reports
  - Label corrections clearly
- Do not email or mail copies of reports
  - May not be processed

How to Submit Compliance Reports

- Make sure to select the appropriate Compliance Document Type.
  - Otherwise, EPA may not be able to retrieve the document
  - Select the correct Compliance Document Topic:

Compliance Document Type	Compliance Document Topic
Production Line Testing	Quarterly Reports
Production Information	Annual Report
Averaging, Banking and Trading	End of Year Report or Final Report
In-Use Information	Manufacturer's Testing Plan, Test Data, or Final Report

  - If the document does not apply to specific engine families, include the applicable model year(s)
  - Include a descriptive Title and Abstract
    - Also describe the type of compliance document in these fields

Availability of HD/NRCI templates

http://www.epa.gov/otaq/certdat2.htm

Industry	40 CFR Part	ABT	PLT	In-Use	Production Reports	TPEM
Marine CI	94, 1042, 1068	Coming Soon	Coming Soon	N/A	Posted	N/A
Locomotives	92, 1033, 1068	Posted	PLT – Posted; Kit Audits – Coming soon	Template not available	Posted	N/A
Nonroad CI	89, 1039, 1068	Posted	N/A	N/A	Posted	Notification – posted EquipMfr Report – posted EngMfr Report – coming soon Bond Waivers- available, to be posted soon
HD Highway (Gas & Diesel)	85, 86, 1037, 1036	Posted	N/A	FileMaker Pro Database (Different Process)	Posted	N/A

TPEM Overview

Transition Program for Equipment Manufacturers (TPEM)

- TPEM Compliance - brief overview
- How to submit notifications, reports & bond waiver requests
  - Use available templates
  - Where to submit
  - Some important points to keep in mind…
- Frequent TPEM compliance issues
  - Number of allowances per company
  - Switching allowances
  - Canada-bound engines
  - Existing Inventory
  - Replacement Engines
  - Dealers

TPEM Overview

- 700+ equipment manufacturers participating
  - All power categories
  - Many are small companies
- Compliance issues with engine manufacturers
  - Unavailability of Tier 4 engines
  - Lack of reporting (Annual TPEM Production Report)
- Compliance issues with equipment manufacturers
  - Unfamiliarity with the regulations
  - Creative ways of ‘increasing’ their allowances
- Engine manufacturers are the largest source of information for equipment manufacturer
  - Please help us spread the word

Submitting TPEM Documents

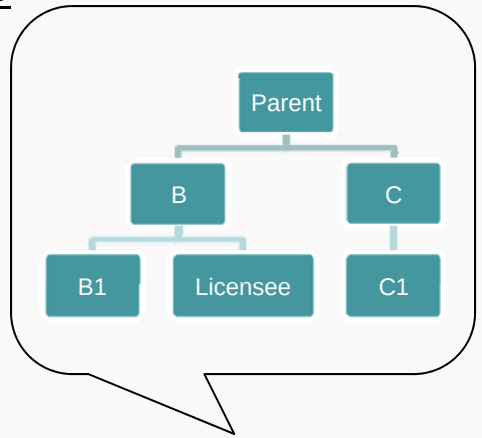
- Use EPA-provided, Excel-based templates
  - Available at http://www.epa.gov/otaq/certdat2.htm#tpem
    - Notification of Intent to Participate (update coming soon)
    - Equipment Manufacturer Annual Report (update coming soon)
    - Bond waiver calculation/request template (available, to be posted soon)
    - Engine Manufacturer Annual Report in development
      - in addition to compliance production reporting
      - identifies buyer or shipping destination
    - No templates needed for hardship relief applications
- Submit documents to TPEM-CI@epa.gov
  - Except hardship relief requests – email those to Justin Greuel
  - Never submit equipment manufacturer documents through VERIFY
  - Do not mail or email copies
  - Do not submit notifications/reports to EPA's enforcement office (OECA)
- Questions?
  - TPEM-CI@epa.gov or Imports Helpline @ (734) 214-4100

Submitting TPEM Documents
Some Important Points

- Notifications
  - Registration process
  - No approval/receipts issued
  - Must be submitted before TPEM participation starts
  - No need to amend except if adding a power category
- Make sure to include contact email, return address, phone number.
- Check webpage for template updates and additional information
- CBI claims
  - New templates will provide a field for CBI claims
  - Current templates - write your CBI claim in the comments section
- Bond waivers must be obtained annually
- Please read the regulations!
  - 40 CFR 1039.625

Frequent TPEM Compliance Issues

- Number of allowances per Company
  - One allowance per power category for the entire company/conglomerate, including:
    - All equipment lines within the same power category
    - All company divisions or sections, regardless of location
    - The parent company and all subsidiaries
    - All companies licensed to produce equipment for you via contract
  - Mergers do not usually result in an extra allowance
  - While it is best that the parent company manage the allowance, a subsidiary can do it as long as the entire conglomerate is taken into account
  - Submit one notification/report for the entire company



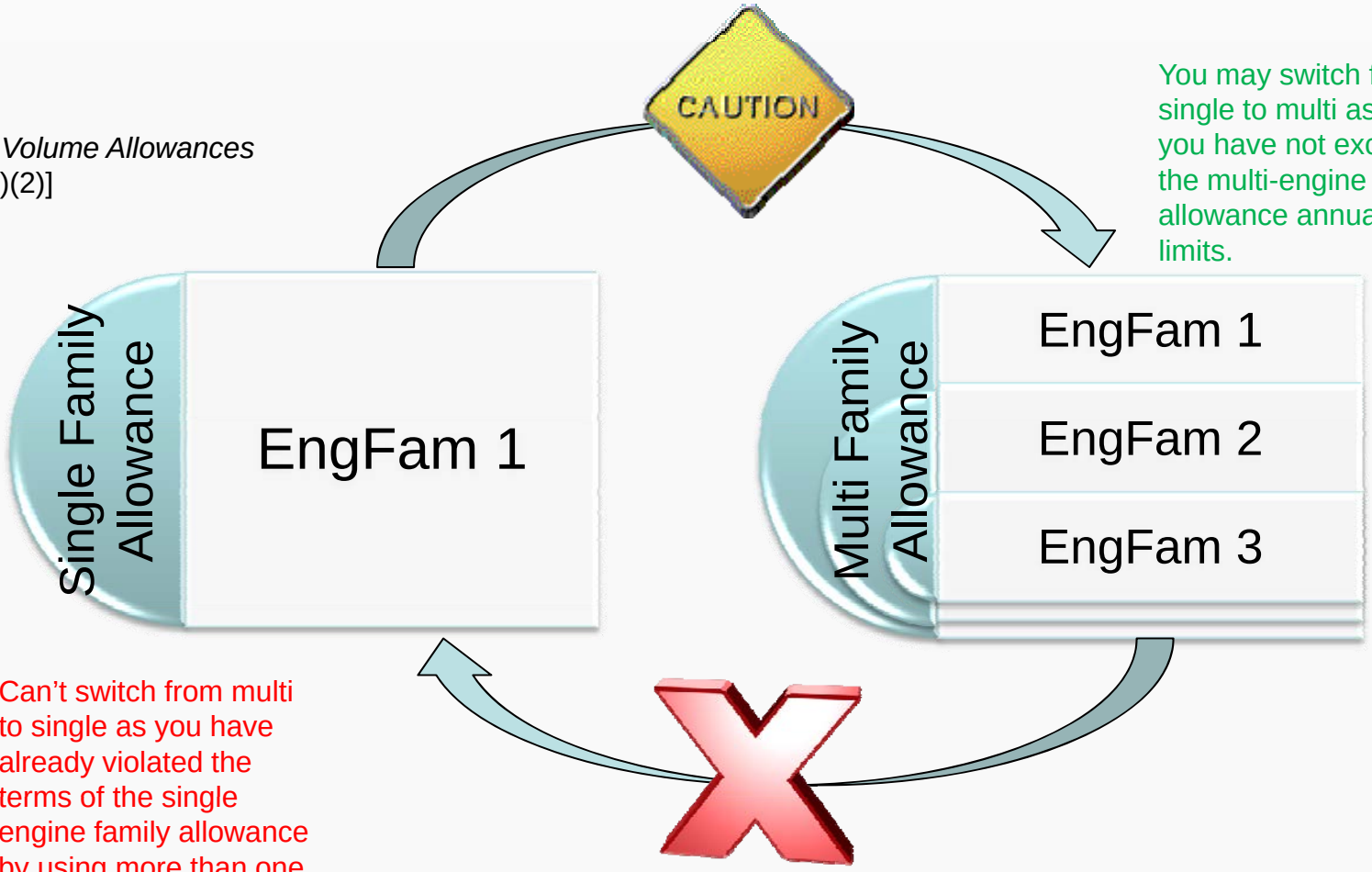
Only one allowance per power category

Frequent TPEM Compliance Issues

- Switching allowances
  - After you've started participation in TPEM, you may only switch allowances if you have not already violated the terms of the allowance you want to switch to.
  - You must comply with one allowance per power category during your entire participation in TPEM
  - No need to file a new notification
    - Explain your switch in the comments section of your report

Switching Allowances - Example

[See *Small Volume Allowances* 1039.625(b)(2)]



You may switch from single to multi as long as you have not exceeded the multi-engine family allowance annual/total limits.

Can't switch from multi to single as you have already violated the terms of the single engine family allowance by using more than one engine family.

Frequent TPEM Compliance Issues

- Canada-directed production
  - Environment Canada (EC) regulations gives you the option of selling/importing US TPEM-labeled engines/equipment in Canada
  - However, if you choose to use a US TPEM label, you must count that equipment towards your US TPEM allowance
    - US label means equipment may be imported back into the US
  - Supplemental “Not for importation into the US” labels are not acceptable.
  - Production meant to be sold in Canada should be labeled “for export only” according to 40 CFR 1068.230
  - EPA is working on guidance letter with EC input

Frequent TPEM Compliance Issues

- Existing inventory rules do not apply to TPEM engines
  - TPEM flex engines are non-compliant engines
    - You may not use left over TPEM engines after the program/your participation is over
    - Destroy or export (relabeled as “export-only”)
- If you need to replace a TPEM engine in service, follow the replacement engine rules
  - Found at 40 CFR 1068.240
- TPEM engines should not be manufactured or sold unless an equipment manufacturer has requested it in writing
  - Dealers/distributors/rental companies do not qualify as equipment manufacturers
    - Therefore, they cannot claim allowances, unless they manufacture their own equipment, have primary design control and install some engines (1039.625(a))

Certification Overview

DEF Quality Detection for SCR

DEF Quality Detection

- On-highway guidance to be issued soon
  - Reiterates that DEF quality is an adjustable parameter given likelihood of in-use adjustment
  - Provides examples for adequate limits on adjustment
    - Detection of poor quality DEF
    - Inducements prevent operation
  - Clarifies how to establish adjustable range and confirm compliance during certification
    - Focus of DEF quality adjustment is on dilution with water
    - Adjustable range is 32.5% urea concentration (pure DEF) to point at which inducements can be implemented

DEF Quality Detection

- On-highway guidance (continued)
  - Outlines expectations on frequency of monitoring in-use
    - Continuous monitoring not necessary
    - Must be able to detect adjustment
  - Provides notice of Agency's plans to test engines with adjusted DEF quality for 2015 model year
- Nonroad guidance to follow shortly thereafter
  - Planning to provide notice of plans to test these engines with adjusted DEF quality for 2015 model year
  - Will also clarify Agency expectations for final inducement (i.e., idle only w/ no power)

Mechanical Nonroad Engines

Mechanical NRCI Engines
Adjustable Parameters

- Engine families <37 kW continue to use mechanical fueling/timing and are naturally aspirated
  - Adjustable parameters
    - Generally set at OEM using adjusting stop screws or shims
    - EPA has found adjustable parameters such as fuel rack stop bolts missing any type of limit to adjustment
    - Adjustment of these items has caused several engines to fail confirmatory testing
  - Approval of certification applications has been held up pending an approved Tamper Resistant Measure (TRM)
    - Should not be able to circumvent TRM using ordinary tools – see 1039.115(e)

Mechanical NRCI Engines
NTE Compliance

- <37 kW engines required to meet NTE for the first time with 2013 MY
  - Naturally-aspirated engines have difficulty meeting PM NTE at altitude
  - Some manufacturers have approved deficiencies
  - Other manufacturers applications awaiting approval until they can demonstrate NTE compliance
    - Applications say engine tested in lab complied with NTE
    - No demonstration of compliance for various altitude and/or ambient temperature conditions
  - May request more demonstration from all manufacturers than testing in test cell

AECD Reporting

Definition of an AECD

- *Auxiliary emission-control device* means any element of design that senses temperature, motive speed, engine RPM, transmission gear, or any other parameter for the purpose of activating, modulating, delaying, or deactivating the operation of any part of the emission-control system.
  - On electronically controlled engines, AECDs are calibrations not devices or sensors
  - Your base emission control system is an AECD
    - Timing map senses speed and torque and modulates injection timing

Acceptable AECDs

- The AECD is not a defeat device
  - A defeat device is an auxiliary emission-control device that reduces the effectiveness of emission controls under conditions that the engine may reasonably be expected to encounter during normal operation and use.
    - Almost all AECDs reduce the effectiveness of the emission control system
      - In most cases, NOx increase as HC or PM is reduced
      - Exception might be AECDs which just derate
  - Reduced effectiveness allowed if
    - Substantially Included in a test
      - Transient test, steady state or NTE
    - Is for engine starting only
    - Engine protection, prevents equipment damage or accidents for operation outside NTE zone
      - NTE deficiencies
      - Minimum strategy necessary
    - For emergency vehicle operation as allowed
- AECD guidance
  - VPCD-98-13
  - Advisory Circular 24-3

Typical AECDs

- Starting
- Cold temperature
  - Cold coolant and or cold intake air
- Engine overheat
- Extended idle
- Transient operation
  - Air/fuel control during accelerations
- Altitude
  - Air density
  - Turbocharger protection
- EGR modulation
  - Protect EGR valve or cooler
  - Condensation protection
- Diesel particulate filter regeneration
  - Automatic
  - Manual
- SCR dosing control
  - Dosing threshold
  - Thermal management
- Sensor failure
  - How failure effects emission control

Reporting AECDs

- Use template found here
  - http://iaspub.epa.gov/otaqpub/display_file.jsp?docid=14266&flag=1
  - The template is found at the end of the guidance document
  - Complete the entire document
    - 2.f. Other approaches considered given current state of technology, why not selected
      - Why is this AECD the best approach?
    - 3.a. Parameters sensed
      - Are you sensing the right parameters
        - » Ambient temperature vs. intake manifold
        - » Altitude vs. air density or speed and temperature of turbocharger components
        - » Time at idle vs. problem caused by extended idling

Reporting AECDs (cont)

- Complete the entire document
  - 4.a. Indicate whether the AECD is substantially included in the FTP *(Nonroad Transient*), or the Euro III (*steady state test*) or Not-to-Exceed (NTE)
    - Where and to what extent is it substantially included?
  - 4.c.i. Emissions rates when AECD activated
    - If you don't report an emissions rate, we are likely to assume the worst
  - 4.c.ii. Frequency of activation (i.e.VMT *or hours*)
    - Fundamental to the design of the AECD, how often is it needed?

Dual Maps

- An AECD which has one calibration for transient operation and another calibration for steady operations
  - For example, city and highway maps for on-highway engines
    - Are allowed if both maps are substantially included in a test cycle
      - City calibration in the FTP
      - Steady state calibration in the RMC

Alternative Fuel Conversions

Alternative Fuel Conversions

- Interest across a number of industries to use more alternative fuels and less diesel
  - Converting in-use engines
    - Fumigation systems
- On-highway engines can use Part 85 regulations
  - New 0-2 years
    - 1 applications per year
  - Inside useful life 2- useful life years or mileage
    - No approvals to date
  - Outside useful life
    - Approx. 14 applications
    - Data typically from PEMS
- NRCI conversion lack a regulatory path for approval
  - Certification or Memo 1A through OECA remain only alternative
  - We are currently moving forward on a path employing a Field Fix “Type C” for OEM certificate holders to use when altering fueling system
    - Implemented through OTAQ
    - Authorizes a positive written response
  - Field Fix Circular may be found in EPA Document Index System:
    - **Title:** Advisory Circular 02B- Field Fixes Related to Emission Control-Related Components

Alternative Fuel Conversions

- Marine CI engines
  - Interest in alternative fuels for both new engine certification and in-service engines
    - Field fix option similar to NRCI
    - Marine remanufacturing system approval
- Locomotives
  - Switching fuels requires certification as remanufacturing system

HD GHG Compliance

Heavy-Duty GHG Compliance

- Technical Amendment Status
- End of Year Reporting
- Innovative Technology Approval Requests
- Off-Road Vehicle Exemptions

Technical Amendment Status

- Signed on May 9, 2013 and will be published in the Federal Register in the next few weeks
- Additional information can be found at: http://www.epa.gov/otaq/climate/regs-heavy-duty.htm
- Updated GEM model will be released concurrently that will reflect the technical amendment changes

End of Year Reporting

- EPA and NHTSA are jointly developing the data requirements for several end of year reports
  - ABT Report for HD Engine and Class 3-8 Vocational Vehicles and Tractors
  - Production Report per 40 CFR 1037.250(a)
  - Off-Road Vehicle Exemption Report per 40 CFR 1037.631(c)(3)
- ABT data requirements are being finalized and will be released to manufacturers in the very near future
- Developing a web-based data submission process that will allow manufactures a convenient method of submitting one set of data that will satisfy both EPA and NHTSA requirements

Innovative Technology Approval Requests

- Manufacturers may request credit for implementing CO_2 reduction technologies that are not captured with the GEM tool and not in common use before 2010 model year
- The general requirements and process can be found in 40 CFR 1037.610
- EPA and NHTSA jointly review requests and then issue separate, concurrent approvals
- EPA is the primary contact for innovative technology approvals
  - Manufacturers should submit their requests to EPA and we will then coordinate the review with NHTSA

Innovative Technology Approval Requests Continued

- A to B vehicle testing is the recommended method of determining the CO_2 emission improvements
  - If appropriate, other methods may be approved
- Improvements from weight reduction technologies that are not enumerated in Tables 4 & 5 of 40 CFR 1037.520 must be approved by the agencies and are evaluated using the GEM tool
- It is strongly recommended that manufacturers submit a technology description and test plan before undertaking a test program

Off-Road Vehicle Exemptions

- Manufacturers may exempt certain vocational vehicles intended for off-road use per 40 CFR 1037.631
- It is recommended that manufacturers seek pre-model year concurrence for these exemptions
- Manufactures may review their off road exemption plans as part of a pre-model year certification preview meeting or submit a letter summarizing their plans for agency review
- EPA will coordinate review of these plans with NHTSA

EPA Web Resources and Guidance

Web Resources

Industries in Verify

- http://www.epa.gov/otaq/verify/mfr-code.htm
  - Manufacturer Code Request
- http://www.epa.gov/otaq/verify/setup.htm
  - Verify Account Setup
- http://epa.gov/otaq/verify/publications.htm
  - Data requirements, business rules, schemas, standards tables
  - Verify guidance/use information
  - Emissions Defect Information Report, Voluntary Emission Recall Report, and Quarterly Report templates.
- http://www.epa.gov/otaq/verify/index.htm
  - Verify System General Information, System Alerts

Web Resources

- http://www.epa.gov/otaq/cert/dearmfr/dearmfr.htm
  - All Industries – Guidance Letters
- http://www.epa.gov/otaq/verify/documents/420b07002.pdf
  - Instructions For Joining the Verify List Server

Web Resources

- http://www.epa.gov/otaq/certdat2.htm
  - Compliance Reports (All industries)
    - Templates, Instructions
      - Production volume reports
      - Averaging, banking, & trading (AB&T) reports
      - Production-line testing (PLT) reports
      - Transition Program for Equipment Manufacturers (TPEM)
  - Certification guidance documents
  - Industries certifying in IMS (HD on-highway, marine)
    - FileMaker Pro application templates

Web Resources

- http://www.epa.gov/otaq/certdata.htm
  - Posted certification data that we collect for all Industries
- http://www.epa.gov/otaq/fees.htm
  - Fee filing form
  - Instructions

Web Resources

- http://www.ecfr.gov
  - Regulations
    - Select Title 40 – Protection of Environment, then
    - Select Applicable Range of Parts, then
    - Select Applicable Part (e.g. 86, 92, 1033, 1039, etc.)
- http://iaspub.epa.gov/otaqpub/
  - OTAQ Document Index System

Recent Dear Mfr Letters

CD-12-06 (March 2012)	Posting of Certification Templates for Model Year 2013 and Later Heavy-Duty Highway Engine and Vehicle Families
CD-12-08 (August 2012)	Approval of Portable Particulate Matter Analyzer
CD-12-09 (August 2012)	Transient Emission Testing of Nonroad Compression-Ignition Engines below 19 kW
CD-12-15 (October 2012)	N_2O Reporting for Model Years 2013 through 2016
CD-12-19 (December 2012)	Reporting Emissions-Related Defects in Heavy-Duty Vehicles and Engines
CD-12-01 (revised) (January 2013)	EPA Standardized Naming Convention for Model Year 2013 and Later Heavy-Duty Highway Vehicle Family Names
CD-13-04 (March 2013)	Shipment of Incomplete Vehicles for Final Assembly by Secondary Vehicle Manufacturers/Dealers

Electronic Data and Information Systems Update

Status of Electronic Certification

- Information Management System (IMS)
  - EPA's historical engine certification system
  - FileMaker Pro database software
  - Mfrs submit applications using template files
    - Templates can be found at http://www.epa.gov/otaq/certdat2.htm
  - IMS still utilized for on-highway and marine CI sectors
  - IMS updated in 2012 for processing of HD GHG cert applications

Status of Electronic Certification

- Verify
  - EPA's engine and vehicle compliance information system (http://epa.gov/otaq/verify/)
  - Web-based system consisting of two elements
    - Public interface – consists of web screens and programs that collect and process manufacturer data
    - EPA-only database – gathers and processes data, issues certificates, and supports compliance functions (access limited to EPA staff)
- Module Development
  - Locomotive
    - Deployed late 2006
    - Does not include non-OEM component certification or AESS systems
  - Nonroad CI
    - Deployed August 2010 (mandatory use began February 1, 2011)

Status of Electronic Certification

- What's next
  - Releasing update to locomotive module for non-OEM component and AESS certification in June 2013
    - Industry webinar on May 8, 2013 covered new certification process (see CD-13-07)
  - Data elements, business rules, etc. for marine CI and HD vehicle GHG modules to be available this summer
    - Deployment planned during FY14
  - HD on-highway engine module (criteria and GHG certification) to follow

Status of Electronic Certification

- Maintenance updates (bug fixes and enhancements)
  - Released to production every 3-6 months
  - Content finalized just prior to the deployment
  - Content is posted to the web after the deployment
  - Major functionality changes will be communicated in advance
  - No current plans for major changes to NRCI

Availability of Certificates / Data

- Posting of certificates on website
  - Historically, have not posted certificates
  - Not frequently requested by public
  - Viewed as having small utility relative to posting non-CBI certification data
- Posting of certification data on website
  - Certification data for all industries is posted every 4 months at http://www.epa.gov/otaq/certdata.htm
  - Data is not posted until the manufacturer-submitted "Introduction into Commerce" date has passed

CBI – Certification and Compliance Data

- CBI class determination issued in March 2013 (see CD-13-05)
  - Final determination reflects comments received from industry
  - Updates the previous determination that was issued in1977 and only covered light-duty vehicles
  - Allows us to continue to publish same general certification data as in past
- General categories considered to be CBI
  - Small SI bond information
  - Projected sales
  - Production dates
  - Aftertreatment device details
  - AECD names/details
  - Engine technical descriptions
  - Engine family comments
- No current plan to publish compliance data (credit balances, etc.), but will follow up with manufacturers if this changes

Reference Slides

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Workshop Presentations and Follow-Up

- Presentations will be available on our website at:
  - http://epa.gov/otaq/hwy.htm
- To join the Guidance Letter list server, or for any comments or follow-up questions, please send an email to:
  - complianceinfo@epa.gov
  - Use subject line “Diesel Compliance Workshop”